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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/805,972

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Bart De Cock

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12/22/2005

BARNES & THORNBURG, LLP

P.O. BOX 2786

CHICAGO, IL 60690-2786

EXAMINER

TANG, MINH NHUT

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 12/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/805,972

Applicant(s)

COCK ET AL.

Examiner

Minh N. Tang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 22 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The amended abstract filed on September 30, 2005 is objected to because "energisable" (line 4) should be -- energizable --.

Correction is required.

Claim Objections

3. Claims 2 and 14 are objected to because of the following informalities: the limitations "the first respectively second motor stator winding", "the second respectively first motor stator winding" are unclear. For examination purposes, claims 2 and 14 are interpreted as suggested by the Applicants in the Remarks pages 12 and 13, filed on September 30, 2005.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Fincher (U.S.P. 4,851,755).

As to claims 1, 7 and 12, Fincher discloses, in Fig. 3, an apparatus and method for detecting rotation of a rotor (12) of a multiple phase motor (10) with bipolar drive, the motor (10) comprising at least a first and a second energizable motor stator winding (14a, 14b), the apparatus comprising means (32) for sequentially and alternately sensing a back electromagnetic force (voltage pulse induced in a deenergized stator winding due to back EMF) on the first and the second motor stator winding (14a, 14b) at or near the end of a period of a non-energized (i.e., deenergized stator winding) state thereof.

As to claims 2 and 14, Fincher discloses in Fig. 3, the means (32) for sequentially and alternately sensing has means (52) for sensing a voltage (i.e., induced voltage pulses) on the first motor stator winding (i.e., the deenergized stator winding) during energizing of the second motor stator winding (i.e., energized stator winding), and means (52) for sensing of a voltage (i.e., induced voltage pulses) on the second motor stator winding (i.e., the deenergized stator winding) during energizing of the first motor stator winding (i.e., energized stator winding).

As to claims 3 and 15, Fincher discloses in Fig. 3, the means (32) for sequentially and alternately sensing has a fixed or adjustable relative position in a non-energized state time-window (see column 6, lines 35-38).

As to claims 4 and 16, Fincher discloses in Fig. 3, means (56) for storing sensed voltage values (a predetermined number of consecutive pulses).

As to claims 5 and 17, Fincher discloses in Fig. 3, the means (32) for sensing has means (52) for sensing multiple voltage samples (61-64), further comprising means (56) for storing the multiple samples (61-64).

As to claim 6, Fincher discloses in Fig. 3, the motor (10) is driven in microstepping operation.

As to claims 8 and 18, Fincher discloses in Fig. 3, means (54) for outputting a detection signal (65) indicative of a stalled condition of the motor (10).

As to claims 9 and 19, Fincher discloses in Fig. 3, means (54) for outputting a detection signal (65) indicative of a rotation of the motor rotor (12) or derivatives thereof versus time.

As to claims 10 and 20, Fincher discloses in Fig. 3, means (50) for sensing a unipolar signal across one non-energized motor stator winding (deenergized stator winding) by connecting one terminal of the motor stator winding (14a, 14b) to a fixed or reference potential while measuring the voltage at an other terminal of that non-energized motor stator winding (deenergized stator winding).

As to claims 11 and 13, Fincher discloses in Fig. 3, excluding a three-phase motor with bipolar drive with star connected coils.

Response to Arguments

6. Applicant's arguments filed on September 30, 2005 have been fully considered but they are not persuasive.

Applicants, in the Remarks pages 13-14 filed on September 30, 2005, asserted that the applied prior art (US 4,851,755) does not disclose the voltage is sensed not

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only during a non-energized state, but more precisely at or near the end of a period of a non-energized state. The Examiner respectfully disagrees because, as disclosed in column 2, lines 4-10; column 5, lines 36-41; column 6, line 66 to column 7, line 3; column 9, lines 46-50 of the US 4,851,755 reference, one phase of a multiple phase stator winding is in a deenergized condition during each step, different phase of the motor are alternately deenergized during consecutive steps, during each step a back electromagnetic force in form of a voltage pulse is induced by the motion of the rotor into the deenergized phase of the stator, and the circuit 32 detects the correct polarity of the pulse induced into the deenergized winding at any given time during operation; therefore it is believed that the US 4,851,755 does disclose the voltage is sensed not only during a non-energized state, but also at or near the end of a period of a non-energized state.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Hill et al.	4,520,302	Stepping Motors And Drive Circuits Therefor.
Nagata et al.	4,641,066	Control Apparatus For Brushless Motor.
Dunfield et al.	5,254,914	Position Detection For A Brushless DC Motor Without Hall Effect Devices Using A Mutual Inductance Detection Method.
Kardash	5,990,656	Frequency Detector.
Du et al.	6,555,977	Disk Drive Motor Position Detection Using

Mutual Inductance Zero Crossing.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Communication

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh N. Tang whose telephone number is (571) 272-1971. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor R. Ramirez can be reached on (571) 272-2034. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.


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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).


MINH NHUTTANG
PRIMARY EXAMINER
12/20/05